

Art Unit: 2611

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

The application has been amended as follows:

On page 3, line 16, replace "from end" with "front end".

REASONS FOR ALLOWANCE

1. The following is an examiner's statement of reasons for allowance: The instant application discloses a method and apparatus to receive a code division multiple access signal. A search of prior art records has failed to teach or suggest, alone or in combination:

“a method, comprising:

inputting a code division multiple access signal received through a radio channel to a searcher; and

processing the received signal in the searcher to obtain a multi-path profile of the radio channel, where processing comprises at least partially removing an effect a transmit filter and a receive filter on the multi-path profile, where at least partially removing comprises passing the received code division multiple access signal through a filter selected to have a filter characteristic *that approximates an inverted amplitude or power response of the transmit filter and the receive filter*” (pg. 8, line 21- pg. 9, line 7; pg. 9, lines 13-20; pg. 10, lines 1-7) as disclosed in claim 1.

“a method to receive a code division multiple access (CDMA) signal from a radio channel, comprising:

inputting a code division multiple access signal received through a radio channel to a searcher; and

processing the received signal in the searcher to obtain a multi-path profile of the radio channel, where processing comprises at least partially removing an effect of at least one of a

Art Unit: 2611

transmit filter or a receive filter on the multi-path profile, wherein said at least partially removing comprises passing the received code division multiple access signal through a *processing unit that uses a least squares criterion to derive the radio channel multi-path profile \mathbf{x} from a searcher profile \mathbf{y} , where $\mathbf{y} = \mathbf{F} \bullet \mathbf{x} + \mathbf{v}$, where \mathbf{v} is a noise vector and \mathbf{F} is a transmit/receive matrix*” (pg. 10, lines 8-14) as disclosed in claim 4.

“ an apparatus comprising:

a receiver front end for receiving a CDMA signal from the radio channel; said receiver front end comprising at least one receiver filter; and

a deconvolution searcher block having an input coupled to an output of the receiver front end for inputting a received signal and an output for outputting a digital representation of a radio channel multi-path profile to a control function, said deconvolution searcher block comprising a unit configured to process the received signal to at least partially remove an effect of at least said receiver filter on the multi-path profile, *the unit comprising a filter having a filter characteristic that approximates an inverted amplitude response of at least said receiver filter*” (pg. 8, line 21- pg. 9, line 7; pg. 9, lines 13-20; pg. 10, lines 1-7) as disclosed in claim 10.

“an apparatus, comprising:

a receiver front end for receiving a CDMA signal from the radio channel; said receiver front end comprising at least one receiver filter; and

a deconvolution searcher block having an input coupled to an output of the receiver front end for inputting a received signal and an output for outputting a digital representation of a radio

Art Unit: 2611

channel multi-path profile to a control function, said deconvolution searcher block comprising a unit configured to process the received signal to *at least partially remove an effect of at least said receiver filter on the multi-path profile, where said unit is further configured to at least partially remove an effect of a transmitter filter on the multi-path profile and to use at a least squares criterion to derive the radio channel multi-path profile \mathbf{x} from a searcher profile \mathbf{y} , where $\mathbf{y} = \mathbf{F} \cdot \mathbf{x} + \mathbf{v}$, where \mathbf{v} is a noise vector and \mathbf{F} is a transmit/receive matrix*” (pg. 10, lines 8-14) as disclosed in claim 17.

“a mobile station, comprising;

a control function;

a receiver comprising a receiver front end configured to receive a code division multiple access signal from the radio channel, said receiver front end comprising at least one receiver filter;

a searcher having an input coupled to an output of the receiver front end for inputting a received signal and having an output for outputting a digital representation of a radio channel multi-path profile to said control function; and

a unit configured to at least partially remove, at least partially via deconvolution, an effect of at least said receiver filter on the multi-path profile, *where said unit comprises a filter having a filter characteristic that approximates an inverted response of at least said receiver filter*” (pg. 8, line 21- pg. 9, line 7; pg. 9, lines 13-20; pg. 10, lines 1-7) as disclosed in claim 21.

“a mobile station, comprising:

Art Unit: 2611

a control function;

a receiver comprising a receiver front end configured to receive a code division multiple access from a radio channel, said receiver front end comprising at least one receiver filter;

a searcher having an input coupled to an output of the receiver front end for inputting a received signal and having an output for outputting a digital representation of a radio channel multi-path profile to said control function; and

a unit configured to at least partially remove, at least partially via deconvolution, an effect *of at least said receiver filter on the multi-path profile*, said unit comprises a processor that is configured to use a least squares criterion to derive the radio channel multi-path profile \mathbf{x} from a searcher profile \mathbf{y} , where $\mathbf{y} = \mathbf{F} \bullet \mathbf{x} + \mathbf{v}$, where \mathbf{v} is a noise vector and \mathbf{F} is a *transmit/receive matrix*” (pg. 10, lines 8-14) as disclosed in claim 26.

“an apparatus comprising a searcher and a filter, configured to input a code division multiple access signal received through a radio channel to the searcher; and

process the received signal in the searcher to generate output data for a finger assignment algorithm that represents a multi-path profile of the radio channel, where processing comprises passing the received code division multiple access signal through the filter selected to have a filter characteristic that approximates an inverted response of a base station transmit filter and at least one mobile station *receive filter* so as to reduce an occurrence of multi-path sidelobes in the output data” (pg. 3, line 27- pg. 4, line 5; pg. 11, line 29-31) as disclosed in claim 32.

Art Unit: 2611

“an apparatus comprising processor unit, and a receiver and a searcher configured to:
receive as a received signal a code division multiple access through a radio channel to the
searcher; and

process the received signal in the searcher to generate output data for the finger
assignment algorithm that represents a multi-path profile of the radio channel, where processing
comprises passing the received code division multiple access signal through *a processor unit that
operates in accordance with a least squares criterion to derive the radio channel multi-path
profile x from a searcher profile y , where $y = F \bullet x + v$, where v is a noise vector and F is a
transmit/receive matrix*, (pg. 10, lines 8-14) so as to reduce an occurrence of multi-path sidelobes
in the output data” (pg. 3, line 27- pg. 4, line 5; pg. 11, line 29-31) as disclosed in claim 33.

“circuitry, comprising:

a searcher comprising an input configured to receive a code division multiple access
signal from a receiver front end, the searcher further comprising an output configured to output a
digital representation of a radio channel multi-path profile of the received code division multiple
access signal, said searcher comprising a deconvolution processing block configured to process
the received code division multiple access signal receiver to at least partially remove an effect of
at least a receiver filter *in the receiver front end on the multi-path profile, the deconvolution
processing block comprising a filter having a filter characteristic that approximates an inverted
amplitude response of at least said receiver filter*” (pg. 8, line 21- pg. 9, line 7; pg. 9, lines 13-
20; pg. 10, lines 1-7) as disclosed in claim 34.

Art Unit: 2611

“a memory¹ storing a program that when executed by a processor results in actions comprising:

receiving as a received signal a code division multiple access signal through a radio channel; and

processing the received signal to obtain a multi-path profile of the radio channel, where processing comprises at least partially removing an effect of *a transmit filter and a receive filter* on the multi-path profile” (pg. 3, line 9-12; pg. 8, line 21- pg. 9, line 7; pg. 9, lines 13-20; pg. 10, lines 1-7) as disclosed in claim 39.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

CONCLUSION

2. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a.) Shan discloses Estimation of Multipath Channel With Sub-Chip Resolution in US 2004/0223540 A1 wherein he teaches an inverse filter operating to substantially cancel the effects of the pulse creation operation in the transmitter/transmit filter. Shan discloses the pulse creation operation as a filter (transmit filter) having a chip sequence of impulses as an input.

¹ Memory is statutory subject matter disclosed on pg. 3, lines 9-12.

Art Unit: 2611

Shan also discloses the inverse filter having a magnitude response (power response) of the transmit filter, but does not teach the inverse filter having a magnitude response of the receive/receiver filter as discloses per the claims of the instant application.

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lawrence B Williams whose telephone number is 571-272-3037. The examiner can normally be reached on Monday-Friday (8:00-6:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ghayour Mohammad can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Tsfaldet Bocure/
Primary Examiner, Art Unit 2611

lbw
April 9, 2010